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Main Currents IN MODERN THOUGHT

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BODY AND MIND

An Abstract

It is now a little over five years since Dr. Gustaf Strömberg of Mt. Wilson Observatory broached in a booklet issued by the Astronomical Society of the Pacific the possibility of joining physics and psychology through the bridge of biology, treating the whole subject of perception, memory, the nature of soul and much else against a background of contemporary mathematical physics. Since then he has published a very stimulating book enlarging these views (The Soul of the Universe) and we have had occasion to notice also an attack, made with the same technique, on the problem of perception, in an article in Science. In the current issue (July) of the Journal of the American Society for Psychical Research Dr. Strömberg brings his thought to bear on another aspect of the theme, Mind and Matter. We quote his opening paragraph, then condense certain passages, in order especially to quote what he, a physicist, has to say about the concept of "organizing fields" first worked out by Hans Spemann, the embryologist.

"The problem of the interaction of mind and matter is one of the oldest, most important, and also most difficult problems that has confronted philosophers. It is often referred to as the psycho-physical interaction problem; it involves the relationship between our mind and our body, and specifically the relationship between our sensations and physical stimulations, between volition and physical activity, and between feelings, memories, and thoughts, on the one hand, and the electric activities in our brains, on the other hand. For the students of extrasensory phenomena this problem is of special interest, because the interaction of different minds is in some way connected with physical processes in the individual brains. Further, a solution of the psycho-physical interaction problem may lead to an understanding of the role spatial and temporal separations play in extrasensory mental intercourse."

With this preliminary clear statement of the problem, Dr. Strömberg immediately warns us that it must be approached by describing mind in terms of matter, or matter in terms of mind; or else "some underlying entity of which both matter and mind are manifestations or aspects" must be found. If they are regarded as completely independent entities, no scientific explanation of their relationship is possible. When physicists began to examine the foundations of their science, however, in the light of the theory of relativity and the wave theory of matter, suspicions of an "underlying entity of which both matter and mind are manifestations or aspects", began to arise; and this, with other innovations incident to a new era in thought, brings hope, if not promise, that the solution of this ancient problem is actually in sight.

Thus there are now scientists who have begun "to realize that physics is based entirely on a study of <u>shadows</u> and can never tell us anything about the 'substance' behind this shadow world." Hence, examining any phenomena in the light of the theory of human knowledge, otherwise epistemology, Dr. Strömberg points out that matter, <u>as we know it</u>, is a play of moving "shadows" in our consciousness, and that we can never speak of the intrinsic nature of matter or atoms. We can only speak of <u>our knowledge</u> of matter. Physical objects are "constructs" peculiar to the human mind, since our knowledge of matter is normally derived from our sense of

vision. On this the intellect forms ideas and these ideas are characteristic of the intellectual equipment of the race. Because other people---many people---see the same things, we say that the "shadows" we observe have a counterpart independent of the observer, or "are real"; but there is nothing that tells us of the intrinsic nature of these counterparts. "It is like looking at a play on a motion picture screen.... The essence of the pictures is in the idea which they convey to our mind. A very young child sees nothing but moving shadows, an older child recognizes many familiar features, and a grown man understands the meaning of the play. These three stages represent the development of our understanding of life, present-day biology being represented by the second stage."

From this point we quote direct:-- "The structure of the optic nerve cells... must be determined by the 'organizing fields', which in a extremely contracted or potential form exist as special elements in the human egg cell. The concept of organizing fields was introduced in biology by Germany's greatest embryologist, Hans Spemann, nearly twenty years ago. He explained the progressive development of an embryo as due to the action of a field of organization which spreads from a certain point in the embryo and whose primary effect is to produce a nerve system. In its fully expanded form this field is responsible for the structure of our brain and our nervous system with its multitude of interconnected nerve cells. Ultimately it determines the function and structural organization of our bodies. A 'living' field capable of organizing an intricate nerve system and a living human body must have an extremely complicated innate structure. There must be singular points with connecting channels, inherent vibrations, a capability of expansion from an infinitesimal size, and, in potential form, progressive changes like those evidenced in the embryonic development. The effect of the living field is to arrange molecules with proper structure and vibrations into the coordinated organisms we observe with our sense of vision. Obviously, then, we have in nerve cells, as in other living elements, two kinds of guiding fields: the electrical fields inherent in all matter, and the living field characteristic for the organized, living structures. Both kinds of fields have sources, which define their properties. The sources of the electrical fields have definite rest-masses and reside in the elementary particles of the atoms; the sources of the living fields have no inherent mass, and their fields expand during growth and contract at death. The growth requires energy, and this is ordinarily obtained from non-living chemical substances (hormones) in which certain frequency patterns similar to those in the living fields have been stabilized by definite atomic configurations and vibrations. The singular points in the living fields can be regarded as regions of minimum energy, or 'holes' into which the atoms or molecules have 'fallen'. We can compare a living field with a 'board' with many vibrating depressions over which fluid matter of a complex structure is moving. Some of the molecules in the fluid have a structure and vibration corresponding to those in particular holes. When the fluid passes over the holes the molecules which do not have the right structure and vibration are unaffected, whereas others with the right structure 'click' into place and are captured. In order to get these molecules out of the holes certain amounts of energy are needed, and practically any kind of external stimulation can furnish this necessary energy. If the molecular structure is deformed or set in vibration by electric or chemical means there is no longer the best possible correspondence between the electrical fields in the molecules and the living fields in the nerve cells. Some of the holes in the living fields are no longer occupied by atoms, and then a strange thing happens. In our consciousness we have a particular sensation or feeling. Let us now consider the origin of color sensations. The living fields in the optic nerve cells were our way of picturing the cause of the particular structure of a shadow play in our consciousness when we looked at the nerve cells in a microscope. A field of force is a construct of our mind, and it is not an ultimate entity without any cause. Its 'roots' lie in another world which cannot be described in terms of space and time. This world, as a potential entity, is everywhere, and it is always capable of manifestations in the space-time frame in which, because of the nature of our minds, we picture everything. In this non-physical world, where there is no space and no time, there are many qualities, among

them colors. When the vital holes in the living field in the optic nerve cells are not occupied by material elements, some of the 'gates' to the universal 'realm of colors' are temporarily left ajar. We then communicate with the world from which, millions of years ago, the color genes emerged into the animal world -- and in our consciousness we then perceive the real essence of these color genes. Their intrinsic nature can not be expressed in terms of space and time. It belongs to the non-physical and not to the physical world, and we call it color or light. The same applies to other kinds of sensory nerve cells. The sensation we feel when we touch something is a result of a change in shape of certain nerve cells in our skin. The vital holes in the living fields in particular nerve cells are temporarily unoccupied by atoms, and then a certain sensation reaches us from a world beyond space and time."

This sensory nerve system forms a coordinated and interconnected system of nerve cells that is symbolic of the interrelatedness between our sensations and our feelings, between volition and muscular movements, and between various memory elements. "Psychically it is manifested by our having a non-divisible personality", which mankind long ago named the soul. "When the vital holes in the living fields in our nerve cells are occupied by material elements, we have no sensation. We therefore conclude that the atoms in our sensory nerve cells prevent us from having sensations when there is no stimulation. This appears to be a general rule. The matter in our brain prevents an avalanche of feelings, thoughts and memories from descending upon our minds. To stimulate a particular memory--that is, to bring it forth on the screen of our consciousness--we must remove some of the atoms from their natural position in the living field, we must upset the close correspondence between the living and the non-living fields. Like Aladdin's lamp, the 'lamp' in our brain must be 'rubbed' before its genie appears. The usual method however is not by rubbing but by burning, that is, oxidation of nerve tissue in particular parts of the brain. The living field soon restores the natural molecular structure of the fluid substance, but in the meantime we had a strange experience. We remembered something that happened long ago." In other words, memories are written in our brain, but "hidden from our knowledge by the veil of atoms." Dr. Strömberg reminds that Bergson intuitively arrived at this same idea, saying of it, "Fortunate are we to have this obstacle, infinitely precious to us is the veil."

It is deep down in the more stable portions of the brain cells that dormant memories lie-memories that perhaps never rise to the consciousness level. Extraordinary stimulation may activate some of them, but "a complete disintegration of the material brain is probably necessary to bring our 'memory genie' out from its hiding. This is perhaps what happens at death....This analysis of our knowledge of the universe has given us reasons to believe that, behind the world of phenomena we perceive with our sense organs, there is another world to which we can not apply our ordinary concepts of space and time. .... I am sure that the time will come when we can more fully understand many obscure phenomena which are fairly well established by empirical methods, but for which we have as yet no rational explanation. .. The world is changing rapidly and the change in ideas is the most important. During the present world crisis many new thoughts are emerging which will, I believe, make even deeper imprints in the history of man than the war now raging. In these thoughts lies the hope of mankind." (G. T.)

A GREAT AUTHORITY WRITES OF THE APES

Book Review

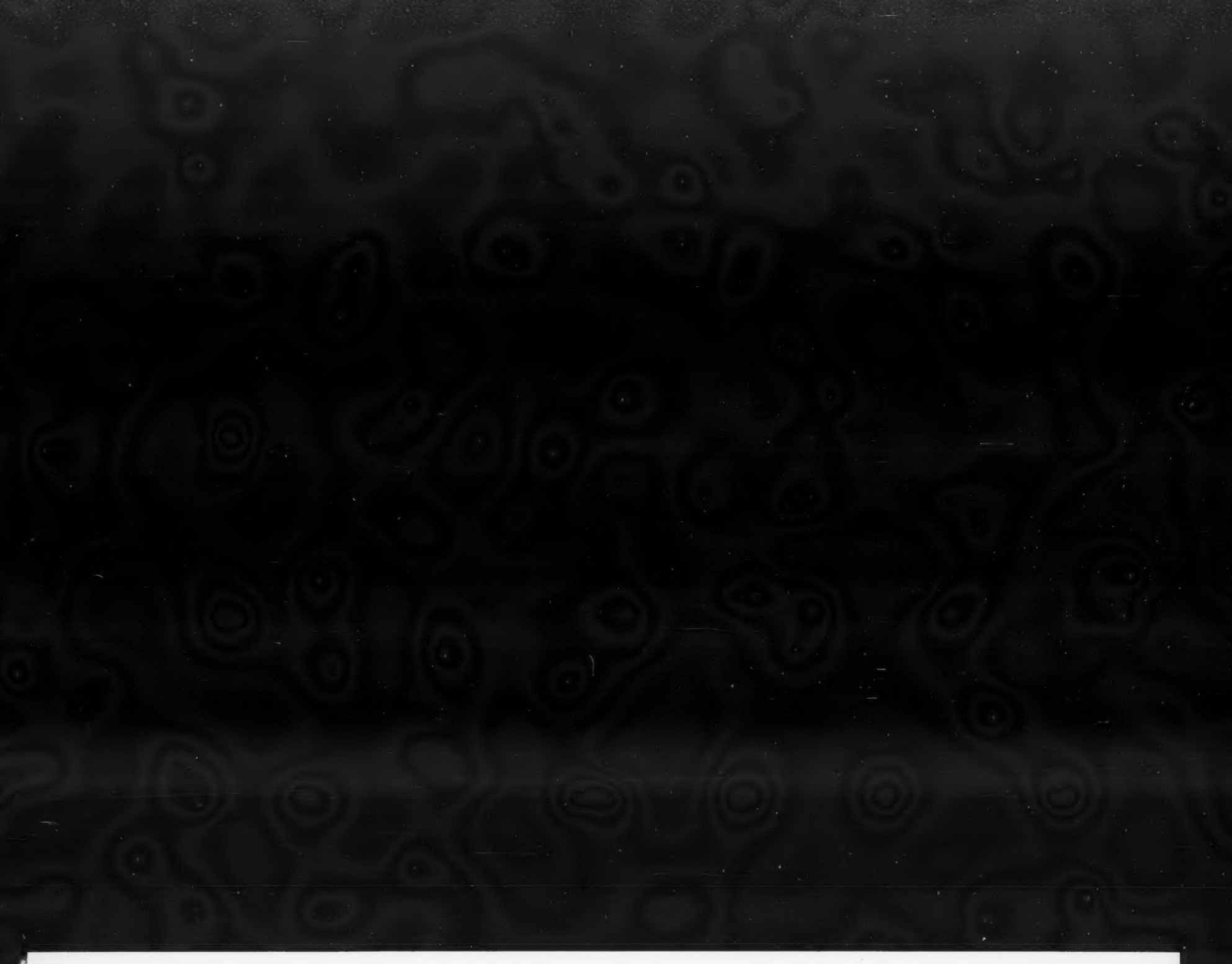
If, as Jasper von Oertzen and others have thought, the anthropoid ape and especially the gorilla, can be explained as posterity from a time when man and some other animal were inter-fertile, then the opinions of someone loving them and living with them stand equal in value with the judgments of great scholars who cage and measure them. The author of this book is such a person, a great authority in a rare but appropriate sense of the word.

Everybody will read this book for entertainment and sheer excitement in the narrative. Some---just what proportion is difficult to guess---will be arrested by the implications inherent in its vivid accounts of animal personalities. Mrs. Lintz's magnificent Saint Bernard dogs, Hercuveen Kennels Saints, are of course famous around the world, but these are only a part of the story told here. For Gertrude Lintz is that remarkable person who, cherishing the "profound, egotistical, factually unfounded conviction that I could love a gorilla enought to keep it well," actually proved it by nursing and loving back to health Massa, the first tiny baby gorilla that she acquired. Literally dying with pneumonia was this little creature when it was delivered to her by the ship that brought it from Africa, and it took long days and nights of unremitting care to win the battle. But she won, and then slow convalescence brought such sympathy between them that even the baby's speech came to be understood, the word full of disgust and rebellion for cod-liver oil, the low gurgled syllables that welcomed food favorites. But "what I felt most strongly about her, as I had about the Ringling infant" (a young circus gorilla that had pined to death shortly before) "was that she needed incessant love and protection." It is this note that distinguishes Mrs. Lintz's work from all previous work in animal education - and "education" is used advisedly in preference to the more usual term "training", for the author explains somewhat tartly that she never has thought it cute to put a kitten in rompers. In all her work with animals her approach has been respectful as well as maternal and profoundly affectionate.

The great creature who now awes even the most thoughtless of the humans who go to see Gargantua the Great, was a piteously burned gorilla baby when he arrived. A disgruntled sailor had thrown acid into his face. He was christened Buddy, and in his turn nursed to health and the schoolroom days which meant great things to both pupils and teacher. Five months were required to teach Maggie Klein, a young chimpanzee, to thread a needle, which she was eager to do. "Four or five times a day she would have a try at this impossible task which represented millenniums of advance from animal to man. Then one day she succeeded. She was weak with excitement, and her little face was bathed in sweat."

It is never in a sentimental way that Mrs. Lintz deals with her "family". One recognizes in her a fine, sane and remarkably courageous woman whose immense yearning towards the whole inarticulate group of beings that are so like humanity and yet not human, led her to the study of them in an atmosphere of home and security. Years ago the anatomist Owen recognized the gorilla as man's nearest of kin structurally. In his book, The Great Apes, Professor Yerkes of Yale says the gorilla is "relatively rare", and the most mysterious of all living creatures. These studies and conclusions of Mrs. Lintz, inspired by her unusual attitude, do not solve the mystery. But they do bring into the foreground of thought the deep significance of that strange emotional need for love which is common to all creatures, together with implications regarding its potential force when it is employed with intelligent purpose. We may be very sure that when a person like the author of this book says of Gargantua, to whom she many times reverts and always in haunting minor key, "he overturned many of the conceptions I shared with everybody about the nature of man himself. If my life was a quest for the true humility despite many successes, he provided the chief motivation," the mystery is deep indeed. "Not-quite-animals", yet most powerful of creatures, that rule the jungle simply by threat of their strength but languish and die away from home, for lack of love alone; creatures that have something in their eyes you cannot look at---they look a man straight in the eye, unwavering---here is mystery almost untouched by psychology, summed up in Mrs. Lintz own words: "There is something about them and within them that often seemed to me lost. I can't express it in any other way; they were lost creatures living on the thin margin of Nature's most dangerous experiment." G. T.

ANIMALS ARE MY HOBBY by Gertrude Davies Lintz, Robert M. McBride & Co., New York, 301 pages, $2.75, richly illustrated.



The chief difference between the cell of plant and animal is the cellulose wall of the former, lacking in the latter, and various kinds of differences between their proteins. Because they have protoplasm in common, plants and animals have been held to be the only living creatures (an man part of them), with the crystals relegated to non-living matter. The connections of crystals with the life process, however, is getting clearer every year through their relations with the vitamins, the discovery that the tobacco mosaic virus crystal is viable, and the like. An important link in the chain restoring crystals to a place in the life kingdoms was forged in 1939 when Dr. Wanda Farr observed protoplasm granules inside the cotton fiber cell releasing, as they burst, crystals which moved over to the cell wall as building material for it. Thus the cell wall, the feature which above all distinguishes the plant cell, is known to be made in part at least, perhaps wholly or mainly, from crystals. Or, we may say, a primitive relation of plant and animal, established when the autotrophs were making the Massaba iron range directly out of iron, thus starting a system of crystal-plant exchanges, continues today in the very heart of the cell.

The tendency in physics and chemistry today is to consider all matter as in some sense crystalline, the structure being referred either to space lattices as discovered by the brothers Bravais or else to systems of space-time lattice-curves whose exact nature is not widely known. And because the crystal (and matter generally) is structurally explicable in mathematical terms, it would be a great gain for biology if a closer union between the physical sciences (chemistry and physics) and biology were established. Dr. Earl. E. Berkley of the Bureau of Plant Industry discusses this union cogently in connection with cellulose and the plastics in Chronica Botanica 6(16): 364-365, 1941, and Eduard C. Lindeman has an excellent description of "Ecology, and Instrument for the Integration of Science and Philosophy" in Ecology Monographs 10(3): 367-372, 1940.

Such a union is of course increasing rapidly, daily, but a question may be raised with regard to its usefulness: Is one or other partner in the union to be the dominant, or shall the purpose be a new formulation of scientific thought ? For if the canons of physics and of inorganic chemistry are to be given precedence over those of organic chemistry (in the real sense of that term) and of biology, then we can anticipate no doubt great gains of knowledge about plastics and the like, but we may deny ourselves a vast wealth of knowledge which lies hidden in living processes. No year passes in which there are not some reports of life processes which completely elude chemists, and every year also, on the positive side, we discover chemicals of living origin which do to living organisms all sorts of things because of life laws not yet understood. Just lately, for instance, the roots of the fall blooming crocus provided an extract called colchicine, which may be sprayed upon the blossoms of such plants as the marigold, causing the pollen grains to double in size and give rise in due time to blossoms eight times the volume of the parents. B. P. Pal of the Imperial Agricultural Research Institute, New Delhi, India, describes in Indian Farming 1(6): 270-273, 1940, the genetics of striking results in larger and more vigorous crops from colchicine, especially chilli plants. If presently synthetic colchicine is prepared, and has comparable results, we have still to explain how life processes run a chemistry which man can only humbly follow from afar.

No one in the scientific fields involved is likely to fall now into the error of last century---though still common among popularisers of science, and many journals which dub themselves scientific but deal really in sensational gadgetry---the error of supposing that pretty soon "mammalian creatures, including men, would be fathered by a chemical and brought into the world in a glass jar", as a writer put it recently as November 28, 1937, in a three column article in the New York Times, discussing the work of Dr. Ethel Browne Harvey of the Princeton University Department of

Biology and others upon the production of fairly ordered cell cleavates from centrifuged cytoplasm of sea-urchin eggs treated with hypertonic sea-water as the parthogenic (paternal) agent. The process by which chemistry will make man is going to take much longer even than my preceding sentence ! For behind the union of biology with the physical sciences lies a series of studies of incredible wealth and beauty---studies yet to be made of the properties of the space-time lattice curves of life which will make the Bravais space lattices seem alphabetical in simplicity. And concurrently we are bound to find that life and matter are not very permanent but only working distinctions, and we shall be compelled to bring more and more of psychology into the scheme. In short, nothing less than the whole is involved. If Nature has made man out of matter, life and self-consciousness, there are going to be no babies bottled in bond by Sears, Roebuck and Co., until man finds out something about the relationship of this new Holy Ghost, Son and Father--matter, life and consciousness--of contemporary science.

And the mathematics which are to unite these Grand Elements, even two of them, has to be a great deal more than the borrowing of analogies, as was done by the teams of biologists at Cornell, Western Reserve and Texas Universities in comparing inhibitor-stimulator factors such as avidin (from raw egg white) and biotin (a B-Group vitamin) to gyroscope forces, however valid such analogies may be in a limited sense. Such analogies amount to admitting once more the superior claims of physics and the complete validity of equating inorganic chemical processes to nature's own. These are the assumptions which lead many medical practitioners to whoop with delight upon finding out what the sulfa drugs do, and to use these drugs as a cure-all. Presently they discover that besides what the sulfa drugs are seen to do at once, there are a number of things they do later.

The principal point is that the number of subtle elements at work in chemical balance in the bodies of animals and men is virtually endless, running at least into millions, and the fine-world disturbance which goes on by use of this, that and the other chemical, cannot possibly in the very nature of the case be measured. It cannot be measured, because no one can possibly tell where the series of subdivisions of life and of matter takes us. Soma, organs, tissues, molecules, atoms, electronic units---this is not a closed series by any means; and even if it were, the loss of factors which make up the whole progressively increases as we go on. What is going on between lives and stomach we may know, but what goes on between atom and molecule we really don't know.

Nothing is more amazing, complex and obscure than the molds, wilts, yeasts, fungi, and the like. It is a warning to us, this maze which is spread like a veil over the fine-world which we have every reason to believe continues beyond the limits of our best vision. Dr. William Stanley finds the tobacco mosaic virus to be in some sense alive even after crystallizing, and takes us down into the world below that veil; and at once a by-product of a yeast is turned up by Dr. William N. Takahashi at the University of California, Berkeley, (N. Y. Times, June 28, 1942) which abates the power of the virus to infect the tobacco plant, and the tale of infinitie variety is resumed at a new level, below the veil of the preceding complex.

At the meeting of the Los Angeles Surgical Society on April 11, 1942, Dr. Ralph Mellon, Director of the medical research division of the Mellon Institute, Pittsburgh, Pennsylvania, who pioneered the American use of sulfanilimid (and was from the beginning cautious as regards it), and who developed sulfathiazole, called attention to the difference between results of using organic compounds of iodine and the inorganic metal. The use of the latter is lethal to the infector, but is also inimical to tissues; and the tincture deteriorates. The organic compounds induce tissue growth, and also the preparations keep well. Thus we have another example of drawing on life's chemistry, and renewed conviction that what is going on in the fine world has to be understood by attacks more subtle than those of chemistry. (An interesting account of transfers of viruses along the stem of the pale-yellow,

parasitic dodder vine will be found in Phytopathology, July, 1941, reported by Dr. Folke Johnson of the Rockefeller Institute at Princeton.

In the discussions of this fine world, contemporary philosophers have come to realize that life wells up, so to speak, from a domain whose properties have first to be explored. In physics, this is known as time-space, and for crystals the space part shows properties of supreme and perfect order. But the proposal to explore the properties of space-time as governing biological doings is relatively novel, and has not been undertaken seriously, as far as we know, except in original inquiries made by the present writer. There are of course many approaches to the idea. Discussing the viruses, Bruce Bliven in the New Republic last year (circa July 14, 1941), said: "As a result of all this, a new philosophical concept is emerging in which the old distinctions between organic and inorganic matter, between molecules and organisms, between 'the living' and 'the dead', are disappearing and the entire universe and everything in it seem to be in one orderly, logical and closely related whole." And a few courageous and original minds (see the references to Dr. Gustaf Strömberg in our pages earlier) are making valiant attempts individually to interpret the data of the day in such terms. But this is not quite enough. And why it is not enough we will make clear.

It is absolutely sure that the crystals are governed by the space-lattices, and by geometric archetype. Moreover, it is the four-dimensional analogue of the three-dimensional Bravais space lattices which govern the formation, while it is going on ---since the marshalling of the molecules in crystallisation involves motion (time), and time is that fourth dimension. It is the over-lordship of the fourth dimensional aspect of the space lattices which allows of laws of crystals classes of the "open-end type" operating. Starting here--on the rock-bottom of nature, the crystals, and on the rock-bottom of data, the universal admission that geometry of space is supreme--the question has been raised, what of the basic properties of time-space as a whole in conjunction with nature as a whole, not just the minerals? The results of our preliminary inquiry are startling, and among the results is the triumphant justification of the insight of thinkers of antiquity who got a good deal closer to the truth than we have so far, though our mathematical techniques are so much superior to theirs, especially to those of the Greeks, who had no zero and thus no minus quantities. The principal results of this research, which is a supremely important project in philosophy, will be stated in our pages as soon as appropriate illustration becomes possible.

But no one can question the theorem's general validity as far as the fine-world is concerned. The pundits in molecular geometry, such as Nils Bohr, Irving Langmuir, Dorothy Wrinch---and thousands more---are quite aware in principle that the great molecules, protein and polymer, are chains, so called, but not in the flat, but in the solid domain. It is highly probable that the battles which rage over the detailed descriptions of these structures will be cleared finally by reference to the hyper-space properties common to the physicists and the biologist. That is (to put the conclusions of the argument shortly), as crystals have the archetype in cube and octahedron, but actually in the fourth-dimensional analogue of cube and octahedron, so also there are fourth dimensional archetypes for plant and animal worlds, geometric in character, but being time-like they are not static. How could they be, since these creatures grow, and many of them are mobile besides? We propose to show, in a later article, that there are exactly as many geometric archetypes in four dimensional space as there are kingdoms in nature, and that the whole argument has prodigious bearing upon the relation of plant to animal and man to animal.

What, however, is admitted in principle as regards molecules and their geometry is by no means admitted as regards organisms, but data is coming in constantly which enlarges the scope of ideal dominion. It is now believed, for instance, that hair growth has an essential relation to the amino acids associated with certain protein

molecules, in particular paraamino-benzoic acid, called paba. An interesting report of its administration to the inmates of a prison, with their consent, will be found in the N. Y. Times, April 3, 1942, and again May 3. The report was presented to the Federation of American Societies for Experimental Biology by Drs. S. Ansbacher and W. A. Wisansky of the research laboratory of the American Home Products Corporation and Dr. Gustav J. Martin of the Warner Institute for Therapeutic Research of New York City. The effects are complex, influencing metabolism and hormones, but one result is the darkening of grey hair. For our purposes the interesting point---just a point, tiny but significant---is that the restoration of hair color is found to be geometric, by a pattern distributed over the subject's head, and especially symmetrical to a median line. Now hair in humans is a patterned growth, and here we have an instance of a revelation of some small details of that pattern by the effects of the amino complex, itself a geometric structure. Thus a small matter in the current news joins thousands of items which make one great demand upon us in these times.

Somewhere down under the applications of chemistry to biology, under the uses of violet rays and electrical excitations to plants, within the molecule and the whole forms of creatures, and in their inter-relations, are vast laws which are bound to be summarizable in a series of increasing simplifications. We need knowledge of these laws, confidence in a supreme order, in life, in man's consciousness in relation to the whole. Today everyone admits that electricity and light and life have many relationships; that many instances of a supreme order detectable by mathematical analysis are found in molecular and atomic structures; that time is a manifestation of some sort of hyper-simensional reality. It is only a step to take that higher dimension as real, and to admit that a new species---or a very old, forgotten species---of philosophy is coming to the fore, realistic-idealism.

Our times and our facts demand many larger and also better definitions of basic elements in thought. If life, for instance, embraces crystals, plants and animals, it must be broadly defined as a principle which is self-forming, a principle rooted in individuals, in personality. And these new definitions bring us over to psychology and even to religion. Such juxtapositions make some scientific workers uneasy. But the leads of fact and reason must not be denied just because they do what earlier science could not do, nor because they seem to exalt Plato or some other personage of antiquity to a very high place even if he seemed to have no science. Shall we, in short, deny the unity of everything vertically in time as old and new, or in depth as between subjective and objective, or horizontally as between East and West, out of caution and vanity, when humanity so bitterly suffers from disunion in these very same dimensions ? F. K.

PHYSIOLOGY OF THE AMINO ACIDS Biology Item

During the entrance of the amino acids into the alimentary tract in the form of food proteins, and their digestion, absorption into the blood stream and passage into the tissues where they become highly concentrated, there are many changes which take place. They may be destroyed and their nitrogeneous parts turned into urea in the liver. Their carbon fractions can be used to form glucose. They may sacrifice themselves to protect us from toxic products or they may serve as source material for certain vitamins, hormones and other compounds with physiological functions still to be identified. Finally they may enter into the proteins of the tissues and become, for a time, parts of our living structures. (Dr. Donald D. Van Slyke, Hospital of the Rockefeller Institute for Medical Research, reported in Science, 95, 259-63, March 13, 1942. A. J. P.)

HAIR GRAYING — Is It Just Elimination ?

According to Dr. Ales Hrdlicka of the Smithsonian Institution, "the hair..... is a fairly important means of elimination of by-products of metabolism..... (Melanin is the dead, inert particles of dark pigment in the blood). The ordinary graying of hair signifies not that the melanin is chaning in, or losing, color, but that less and less of it is being formed. The thoroughly gray or white hair is that which is entirely free from melanin.....a really sudden grayness would seem impossible.....If sudden graying is a reality.....then the loss of color must be due to other factors, perhaps the sometimes suggested bubbles of gas in the medulla of the hair. It is difficult to see how any vitamin or other substance could restore color." (Science Digest, 12, 55, July 1942. A. J. P.)

HAIR COLORATION — Probably Not Elimination !

However, according to Dr. Owen S. Gibbs, Director of the Medical Research Division of Plough, Inc., Memphis, Tenn., the coloring of the hair is functional in character and not automatically dependant on some generalized bodily change or growth, as shown by the change in hair color from winter to summer in arctic foxes and ptarmigans. Moreover, in birds and to some extent in mammals, the pattern of the hair coloring changes with sex activities. Much evidence shows that melanin formation is a local matter. The Negro's hair grays with age, his skin does not. Other facts show that fiber pigmentation is a special function and is probably capable of being altered in a quantitative manner by pharmacological agents. (Science 95, 576, June 5, 1942. A. J. P.)

ECONOMICS IS THE SCIENCE OF STEWARDSHIP, by Norman Dodd Reprint

/The following paper, reprinted in full and by permission from The Humanist, Summer, 1942, is the first systematic outline of the studies made by the Guild of American Economists, in the words of its Director, Mr. Norman Dodd. It calls for the closest possible reasoning, in preparation for the contents of the eighth paragraph, in which the appositions between art, science, philosophy and religion on the one hand and production, management, education and government on the other are clearly to be taken as one-to-one correspondences of explicit importance. What such relations mean is manifest when we consider production and art. Mass production is mostly hideous in result, except where sheer functionalism enforces some elements of beauty. But clearly the over-all effect of a motor car designer's work is equivalent to that of a cathedral designer, since the car is used and looked at by millions of people. Mass production art is young. So also economics has yet to acquire its scientific base. (This is doubtless the special care of the Guild). Education could do with a great deal more good philosophy, and certainly a government not resting on religion is an evil thing. Thus the studies of the Guild are seen to be enterprises leading to the erection of a culture, not the defence of a dying system nor the advocacy of doctrinaire notions. The Guild may be addressed by mail at 442 East 58th Street, New York City. F. K./

When Japan attacked the United States at Pearl Harbor a favorite subject of debate since November 1918 ceased to be debatable. All questions regarding the voluntary extension of the American sphere of influence were answered by this one event. Since then discussion has centered naturally upon our ability to plan, while argument has been limited to the ways and means of developing that harmony of thought and action upon which all effort must ultimately depend for success. We have been catapulted upon a world stage and are now challenged to expand our thinking---deepen our thoughts---proportionately.

As we turn to the past for assurance in the face of this challenge we are confronted with a record of fundamental discord summarizing itself in the social-economic conflict. In this light our history becomes the story of a disunity of economic practice and social concept and of our efforts to resist its consequences. In spite of these efforts the conflict still persists, while the need for a system of thought governing both human relationships and the use of our material resources has intensified to a point where a warm welcome should await the presentation of well integrated ideas promising to result in social and economic reciprocity. In the face of contemporary events the search for such ideas should be our most pressing concern.

Two years ago The Guild of American Economists was formed to conduct such a search, looking forward to the determination of the responsibilities of ownership and their expression in economic terms. For that purpose it set up certain guideposts, among them being its own definition of economics as the Science of Stewardship; its conception of economics as a dynamic rather than a passive subject; and its rejection of economics as a political science with the inference that the privilege of application rested in the State. Against this background The Guild then studied the historic relationship between the American economy and those social truths originally accepted as self-evident expressions of "the laws of nature and of nature's God", and examined the effect of economic practice upon the expression of these truths in our national life. It analyzed the practices, customs, instruments and institutions comprising our economy as to their origin, purpose, use and consequence and appraised them on the basis of their contribution to social values and their confirmation of economic principles in operation. Its objective was thus to relate the business and political history of the United States to a social-economic conflict in terms of cause and effect.

ECONOMICS IS THE SCIENCE OF STEWARDSHIP, by Norman Dodd Reprint

/The following paper, reprinted in full and by permission from The Humanist, Summer, 1942, is the first systematic outline of the studies made by the Guild of American Economists, in the words of its Director, Mr. Norman Dodd. It calls for the closest possible reasoning, in preparation for the contents of the eighth paragraph, in which the appositions between art, science, philosophy and religion on the one hand and production, management, education and government on the other are clearly to be taken as one-to-one correspondences of explicit importance. What such relations mean is manifest when we consider production and art. Mass production is mostly hideous in result, except where sheer functionalism enforces some elements of beauty. But clearly the over-all effect of a motor car designer's work is equivalent to that of a cathedral designer, since the car is used and looked at by millions of people. Mass production art is young. So also economics has yet to acquire its scientific base. (This is doubtless the special care of the Guild). Education could do with a great deal more good philosophy, and certainly a government not resting on religion is an evil thing. Thus the studies of the Guild are seen to be enterprises leading to the erection of a culture, not the defence of a dying system nor the advocacy of doctrinaire notions. The Guild may be addressed by mail at 442 East 58th Street, New York City. F. K./

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The result was a conclusion that the historic relationship between our economy and social truth had been one of conflict; that the effect of our economic practice had been to subject the expression of social truth to strain; and that harmony between human relationships and the resources of the material world depended upon an acceptance of economics as a science of stewardship. It became clear that the relation of the social to the economic aspect of life demanded that a dedication to social truth be accompanied by an expression of economic truth on the basis that the practice demonstrating the one harmonize with the principles defining the other. On evidence drawn from the older philosophies and modern science The Guild is now satisfied to accept this axiom as proof that there exists a single and practical foundation for political judgment and managerial decisions, and is convinced that coordinated exploration of these areas of thought and disclosure can identify such a basic frame of reference.

In this light the issues and theories which compromise the principles to which the United States was originally dedicated, rely upon material circumstances for their vitality and upon traditional economic interpretation for their support---a fact which establishes the need for a distinctly American approach to economic thinking if we are to liquidate the fiscal and legislative complexities which are rooted in a mutual antagonism. In the same light man's capacities---physical, mental, emotional and spiritual---unite to form the base upon which he must erect his culture, while art, science, philosophy and religion stand out as the channels for the development of these capacities, and their expression in production, in management, in education and in government. Mathematics, economics, metaphysics and ethics then fall naturally into a classification as basic instrumental sciences enabling the engineering, accounting, teaching and legal professions to assume coordinated responsibility for maintaining the balance between human action and human understanding.

The purpose of The Guild now is to present its findings to persons who are deeply concerned with current events and desirous of interpreting them in terms of the proprietary, executive, professional and political responsibilities which accompany American citizenship. Its desire is thus to make them aware of the over-riding laws which lie within scientific thinking to set a standard for economic practice; to stimulate their interest in the violation of these laws in our present economy; to aid them in the identification of the causes of these violations; help them to trace both the social and economic consequences; and to assist them to build a faith in economic adjustments which, when applied, shall establish social truth beyond the doubts and questionings of reasonable men. In so doing, The Guild hopes to contribute constructively to breaking down the resistance to integrated research and point the way to practices within the industrial, financial, educational and political worlds which will confirm the dignity of the individual and justify a government by law and not by men.

COMMON SENSE IN HIGH PLACES

Extracts

The New Republic of June 15 contains an article, The Future We Fight For; by Milo Perkins, Director of the Board of Economic Warfare. The article is the text of a speech made by Mr. Perkins on May 25 at commencement exercises of Swarthmore College. Mr. Perkins sees the war as part of the struggle to adjust to mass - - production industry. We must conquer the machine and bring economic security to the whole world if we are to win the peace. Private industry may survive if it can solve the problem of unemployment, and tap markets untouched and backward today. Above all, we must have faith in the future and a willingness to greet necessary changes in a spirit of adventure. Below are typical quotations:

*We are engaged in a struggle that transcends the present war. This is a long, long fight to make a mass-production economy work. The battle started when

machines became important in the lives of men. It should be over within the generation following this conflict. The battle will be won when we have built up mass consumption to a point where markets can absorb the output of our mass-production industries running at top speed. Then, so far as our physical needs are concerned, life can become a journey to be enjoyed rather than a battle to be fought. ..Complete victory will not be won until there is a full and increasing use of the world's resources to lift living standards from one end of this planet to the other. The twentieth century is a time set apart for the winning of this total triumph. ... Men lost their battle to avoid this war. It was lost primarily because the world was unable to distribute what it had learned how to produce. . . .Full-blast production for a gradually rising standard of living will be as necessary to win the peace as all-out production now is to win the war. It will be physically possible. Our number-one post-war job will be to make it fiscally possible. If we can do that, private enterprise will enter upon an era of unparalleled activity.....The plain people of this earth know what they want in the post-war period. Above all else they want to be wanted; they want a chance to work and be useful. They want an income which will give them enough food and clothing and shelter and medical care to drive the fear of want from the family fireside. And they want these simple things within a society that guarantees their civil liberties.....The plain people will be understanding about the problems of readjustment. ...The one thing they won't do is to take 'no' for a final answer to their cry for full employment. Not after all this suffering; not when they see themselves surrounded later on by too much of what they need most and yet might not be able to get. Idleness, be it of men or money or machines, will be the one unforgivable sin of the post-war world... After all, the only lasting security for any of us lies in moving constantly forward. Those who have won to this understanding welcome a changing future every morning of their lives - and love it. They alone have the competence to lead us through the rest of this dramatic epoch upon which the world has now entered." (M. H.W.)

PROPHECY IN HIGH PLACES Extract

The New Republic, issue June 22, ran an article, A Job for Mr. Davis, setting forth in a semi-humorous manner the difficulties Mr. Davis will have to solve his new job. It closes with what is now seen to be a prophetic paragraph: "But these are only his first and easiest tasks. Mr. Davis' real troubles will begin when he tries to assemble an intelligent staff, and finds that everyone he wants to hire has been blacklisted by the FBI and the Civil Service Commission. His real troubles will begin when he is attacked from ambush by Colonel McCormick's guerillas. His real troubles will begin when he has to face Congress, which thoroughly distrusts all attempts by the government to state its war aims. His real troubles will begin when he tries to formulate intelligent policies, and finds that every step he wants to take would lead him into forbidden territory (but you mustn't do <u>that</u>, Elmer, oh, no, it would deeply offend Senator Byrd. And think of the Dies Committee!)." M. H. W.)

ANTHROPOLOGY ITEMS

Problems of Brotherhood

The uproar over the policy of the Red Cross in segregating Negro blood, running a dual system of classification and storing, emphasizing racial discrimination and helping Hitler's ideology, has now finally become such a tumult that the Journal of the American Medical Association (July 4, 1942) prints a powerful protest by the Committee on Race Relations of the American Association of Physical Anthropologists. The whole affair illuminates in a lurid glow the odd mixture of religious obscurantism, political maneuvering, ignorance of science, philosophical bankruptcy and other oddities which can find lodgement in the human constitution. The Committee above-named makes reference to "the origins of some of the substances which are widely and effectively used in modern medical practices and which are readily accepted by the patient," meaning preparations of the glands of goats, cattle, horse blood, the urine of pregnant mares and the like which, indeed, some people have no objection whatever in having injected into their blood stream. Whether they would be "readily accepted" if the patient knew the origin is beside the point. He does in fact patiently accept them. After all, being patient is a patient's distinguishing feature.

What might be done to introduce once and for all an effective clearance of the aforesaid oddities of human nature is one of the perpetual questions raised by anthropology. Evolution, in respect to man, offers the hope that conscious efforts would really do much more, if the kind of objectivity used in science and philosophy could also be used in religion and in art. So much out of traditional religion restrains our growth; yet religion and ethics alone prevent the results of science from destroying us. The difficulty in making religion and art as objective as science and philosophy rests in the fundamental fact that the emotional side of man, represented by religion and art, is not readily subjected to self-consciousness in the very act of its exercise. Furthermore religion in any real sense must have to do with the soul, and is quite as high as philosophy is on the mental side, even higher, often. Nothing short of an educational system in which real religion---the redemption of all scientific fact by ethical considerations which arise from the facts and are not extraneous and imported---will solve this problem. And of course there can be no such redemption until the whole picture provided by science is seen as an integrated whole. F. K.

WHAT IS A RACE ?

A Note on the Ainu

Nor is the scientist immune from his own kinds of reactions to obscurantism. The hairy Ainu of Japan's northern islands has long been known as a strange mixture of Polynesian, "Aryan", and other strains and cultures. They are a specialty in the great overflow of the basic strain which made headway Eastward and got lost in whatever blood was found there, by that people we now know to be the ancestors of the "white race". That eastern flow must be very old, for it shows traces in Polynesian, Melanesian and many other peoples, and yet has between it and its Central Asian homeland the great blocks of clearly defined Mongolian-Chinese peoples. The study of Greater India is throwing a great deal of light on the whole question. But now, the Japanese being anathema, reports of the Ainu from the Russian anthropologist L. Stenberg are being interpreted so as to play down the white element in Ainu culture. G. L.

INTRA-RACIAL TWINS

An Unusual Case

A German woman married to a Jew had twin children, a boy and a girl. She declared to the State authorities that the children were not in fact the offspring of her husband, but of another man, a non-Jew. Anthropological investigation including blood-tests and morphological characteristics led to the decision that neither man could be the father of both twins. The boy was believed to be the off-spring of the Jewish husband and the girl to be actually the daughter (by superfecundation) of the other man. (P. Popenoe, in Biol. Absts., October, 1941, reporting an article by Eberhard Geyer, Ein Zwillingsparches mit zwei Vatern. Arch. Rass.-u. Ges. Biol. 34 (3): 226-253. 7 illus. 1940.)

"As a result of these various difficulties, we find ourselves left with a pair of infants on our door-step the legitimacy of both of which we discover to be questionable. On the one hand we find ourselves confronted with a world-picture which is strictly deterministic, but imaginary; on the other hand we have a sense-world which is real enough but in which no refinement of scientific investigation will ever discover the least shred of strict determinism, in the accepted sense.

However, we still have, according to Planck, another alternative that may yet enable us to bring determinism back into our real world.

The process of predicting an event involves two inescapable elements: the object of prediction (in this case some physical happening); and the subject of prediction, in this case a human mind. We have so far striven unsuccessfully to escape the implications of indeterminism by changing the object of prediction--taking it out of the objective world and placing it in an imaginary world-picture. But supposing we tried to change the subject of prediction instead ? Suppose that, instead of a human mind, with its imperfections and limitations, we substituted an ideal mind, transcending physical nature and therefore not bound by its limitations, capable of perfect knowledge of all existing events, and therefore capable of perfect prediction ? Such an assumption, says Planck, would satisfy the requirements of our definition of causality, and would thus restore determinism.

Such an Ideal Mind (we are now justified in using capitals), would be capable of correctly gauging all forces in action at any moment and therefore be capable of foreseeing all results. Of such an Ideal Mind we could say, with Omar Khayyam, that It 'the first Morning of Creation wrote what the Last Dawn of Reckoning shall read.'

But does such a world-view--one, that is, that includes an Ideal Mind at its center, capable of foreseeing all human actions--destroy all notion of human free will? Not necessarily, says Planck. To some omniscient extraneous intelligence, such as we imagine God to be, it is true, the various forces that have led up to a certain choice may be visible, and the choice in that sense can be seen to follow a law of causation as definite as that which the physical determinist finds in the idealized world-picture we have mentioned. But to the human being in question, the will remains free, precisely because at the moment of choice it is impossible for the individual to see all the forces that have led up to his choice, just as it is impossible for the eye to see itself. 'He who feels himself restricted in his moral dignity by such an idea forgets the enormous superiority of the ideal mind over his own intelligence.'

At any rate the issue is now clear. Either a physical world in which indeterminism reigns--and therefore, according to Eddington and others, free will for man; or a physical world and back of it an Ideal Mind--and again free will for man. Materialism finds itself neatly spiked on both horns of the dilemma."

(These are the closing paragraphs of an article of remarkable clarity by Alexander Horne, Secretary of the Theosophical Research Association, in The Theosophist, Madras, India, May, 1942, in which the author surveys closely the present position of the notion of free will in scientific thought, and especially physical science thinking. Mr.Horne draws only on generally known writings of conspicuous thinkers, and his bibliography is in itself also worth recording. H. Wildon Carr, The Unique Status of Man, 1928; Sir James Jeans, The Mysterious Universe, 1931; Erwin Schrödinger, Science and the Human Temperament, 1935; W. Heisenberg, The Physical Principles of the Quantum Theory, 1930; Scientific Monthly, 1935; A. H. Compton, The Freedom of Man, 1935; Sir Arthur Eddington, New Pathways in Science, 1935, The Nature of the Physical World, 1930, and the Decline

of Materialism, in Smithsonian Report, 1932; J. G. Crowther, Science for a New World, 1934; Max Planck, Where is Science Going ? 1932. F. K.)

BASIC WORK ON THE HISTORY OF WESTERN ASTROLOGY

Book Notice

In the preface to her admirable volume dealing mainly with the history of astrology in the Western world, and that most thoroughly, Miss McCaffery says gently to the ignorant men and women who unscientifically hold in contempt something they have not examined: "It is a very moot question whether anyone should write about any subject until he has studied it." This slender and piercing shaft gives a hint as to the quiet, assured and scholarly tone of the best contemporary work on the western history of the art which gave birth to the oldest of all the sciences.

The difficulty which this book faces, confronting the modern literate but frequently suspicious and vain mind, is that the prior work which should be done to allay those suspicions and supplant that empty vanity with substantial fact has not been done, and needs to be done. By this is meant the evolution of enough radical astrology to remove a fair part of the science from the class of the delicate arts to the class of the mechanical sciences, the public domain. If a man doubts that water can be reduced to hydrogen and oxygen, he can be told exactly how to do this himself, in a simple manner. There is no simple way for him to manufacture for himself monoaceticacidester of salicylic acid, though he may have taken quantities of it (aspirin) and "believe in it". Now in astrology there are certain simple aspects which can be reduced to a formula, might indeed be set up on something like a tide-predicting machine. The factors ruling personal appearance, for example, are frequently such as to give the general appearance closely, and the end-product, the description, is one which is in the public domain. If, for example, the subject turns out to have the characteristic rounded back, and forward-set shoulders of the Scorpio type, any group of people can decide whether he has or hasn't, by looking at him. Mars on the ascendant and a few other factors will give another high run of cases with red hair and general rufous complexion, which can be checked up very readily. I believe that if the friends of astrology were to build up an appearance-forecasting machine, limited to sign and degree on the ascendant, place of the ruler, co-ruler and the sun and moon alone, and run the machine for say 50,000 cases in New York City, astrology would enter every psychology department in universities by the front door. (It turns up at the service entrance, now and then)

Meantime here is a splendid book on the western history of the Cinderella of modern science, pending the arrival of the Prince with the glass slipper, or some other form of rescue such, say, as exploration of hyperspace in a manner which will expand philosophy to make room for this old art, we can at any rate be grateful for a comprehensive book, well illustrated, good-humoured, and almost entirely free of the fanciful. F. K.

ASTROLOGY, its History and Influence in the Western World, by Ellen McCaffery, Scribners, New York, 1942, 408 pages, illustrated, $3.00.

OF TIME AND CONSCIOUSNESS

An Abstract

Many of the problems of philosophy are due to the habit of thinking of time under the image of a stream which carries us along through a region consisting of the past which we have left and the future through which we are to go. We should look rather upon ourselves as situated in a stationary present, drawing into ourselves an empty future and projecting it, populated with events, as the past. This past constitutes the field of consciousness, elements of which are sense-data and feelings. Thus the distinction between subject and object is the distinction between the present and the past. The rational operation of the subject correlates the elements of the field of consciousness into systems, such as physical objects, electrons, light and space. The elements are given and unalterable, and are known in the sense of being possessed, but the arrangement of these elements into a rational system cannot result in final knowledge because new experiences may demand a change in the system. (W. E. Agar in Bio. Abst. March, 1942 V. 16, #3, reporting an article by Herbert Dingle, (Imp. Coll. Sci. London) on The Philosophical Viewpoint of a Scientist. Proc. Aristotelian Soc. 39: 121-146. 1938-39. G. T.)